

22. A protein, produced by expression of recombinant DNA in a host cell and isolated from said host cell comprising a pair of polypeptide chains disulfide bonded to form a dimeric species, each of said pair of polypeptide chains having less than 200 amino acids in a sequence sufficiently duplicative of the sequence of COP5 or COP7:

1 10 20 30 40
COP5 LYVDFSDVGWDDWIVAPPGYQAFYCHGECPFPLAD

50 60 70

HFNSTNHAVVQTLVNSVNSKIPKACCPTELSA

80 90 100

ISMLYLDENEKVVVKNYQEMVVEGCGCGCR

1 10 20 30 40
COP7 LYVDFSDVGWNDWIVAPPGYHAFYCHGECPFPLAD

50 60 70

HLNSTNHAVVQTLVNSVNSKIPKACCPTELSA

80 90 100

ISMLYLDENEKVVVKNYQEMVVEGCGCR

such that said dimeric species has a conformation capable of inducing bone and cartilage formation when implanted in a mammal in association with a matrix.

23. The osteogenic protein of claim 22 having a molecular weight of about 30 kD when oxidized as determined by comparison to molecular weight standards in SDS-polyacrylamide gel.

264